

TABLE OF CONTENTS

Chapter 1 – Overview	1-1
1.1 Background	1-1
1.2 Overview of 2015 WASP	1-1
1.2.1 Aviation System Performance	1-2
1.3 Prior WSDOT Aviation Planning Studies	1-3
1.3.1 2009 Long-Term Air Transportation Study	1-3
1.3.2 2012 Aviation Economic Impact Study	1-4
1.3.3 2013 (and prior) Airport Pavement Management System	1-4
1.3.4 2014 Airport Investment Study	1-5
1.4 Report Layout	1-5
Chapter 2 – Goals, Objectives, and System Performance Measures	2-1
2.1 Process	2-1
2.2 Aeronautical and Airport Safety	2-2
2.3 Economic Development and Vitality	2-3
2.4 Education, Outreach, and Community Engagement	2-4
2.5 Infrastructure Improvement, Preservation, and Capacity	2-4
2.6 Aviation Innovation	2-5
2.7 Modal Mobility, Capacity, and Accessibility	2-6
2.8 Stewardship	2-6
2.9 Sustainability	2-7
Chapter 3 – Inventory	3-1
3.1 Introduction	3-1
3.1.1 Inventory Process	3-1
3.1.2 Existing Airport System	3-2
3.1.3 National Plan of Integrated Airport System	3-3
3.1.4 FAA Asset	3-7
3.1.5 Non-NPIAS Airports	3-8
3.2 Airside Facility Inventory	3-8
3.2.1 Runways	3-8
3.2.2 Runway Safety Areas	3-12
3.2.3 Taxiways	3-13
3.3 Federal Aviation Regulation Part 77	3-14
3.4 Landside Facilities and Aviation Services	3-16
3.4.1 Accessibility	3-16
3.4.2 Fuel Services	3-16

3.4.3 GA Terminal Facilities	3-17
3.4.4 Real Estate/Business Park/Manufacturing Leases	3-18
3.4.5 Aircraft Hangars.....	3-18
3.5 Aviation Activity	3-19
3.5.1 Based Aircraft	3-19
3.5.2 Aircraft Operations and Passenger Enplanements	3-20
3.5.3 Activities.....	3-21
3.6 State, Local, and Regional Issues.....	3-23
3.6.1 Land Use Compatibility.....	3-23
3.6.2 Funding Availability	3-24
3.6.3 Wildlife Management Plan.....	3-24
3.7 Inventory Summary.....	3-25
3.7.1 Findings	3-25
Chapter 4 – Aviation Trends and Projections	4-1
4.1 Introduction	4-1
4.2 Aviation Demand Profile and Forecast	4-2
4.2.1 Industry Trends	4-3
4.2.2 Washington State Aviation Trends.....	4-18
4.2.3 Projections of Washington State Aviation Demand	4-25
4.3 Air Cargo Market Profile and Forecast	4-37
4.3.1 Air Cargo Industry Background	4-37
4.3.2 North American West Coast and Regional Air Cargo Activity.....	4-42
4.3.3 Washington State Air Cargo.....	4-44
4.3.4 Washington State Air Cargo Hub Airports.....	4-48
4.3.5 Washington State Air Cargo Forecast	4-61
Chapter 5 – Capacity Analysis	5-1
5.1 Introduction	5-1
5.2 Airfield Capacity	5-1
5.2.1 Serving Current Demand.....	5-3
5.2.2 Serving Future Demand	5-4
5.3 Aircraft Storage Capacity	5-6
5.3.1 Serving Current Demand.....	5-7
5.3.2 Serving Future Demand	5-9
5.4 Air Cargo Capacity.....	5-13
5.4.1 Overall Cargo Facilities Planning Concept.....	5-14
5.4.2 Washington State Air Cargo Facilities	5-15
5.5 Summary and Findings.....	5-17

Chapter 6 – Classifications and Airport Metrics	6-1
6.1 FAA Classifications	6-1
6.2 WASP Airport Classification Process	6-3
6.2.1 Major	6-6
6.2.2 Regional.....	6-7
6.2.3 Community.....	6-7
6.2.4 Local.....	6-7
6.2.5 General Use	6-7
6.3 Airport Metrics	6-8
6.3.1 Aeronautical Airport Safety	6-8
6.3.2 Economic Development and Vitality.....	6-11
6.3.3 Education, Outreach, and Community Engagement.....	6-14
6.3.4 Infrastructure Improvement, Preservation, and Capacity.....	6-15
6.3.5 Aviation Innovation.....	6-17
6.3.6 Modal Mobility, Capacity, and Accessibility	6-18
6.3.7 Stewardship.....	6-19
6.3.8 Sustainability.....	6-23
6.3.9 Summary of Airport Metrics.....	6-26
6.4 NPIAS Classifications and Evaluation	6-27
6.4.1 NPIAS and ASSET Criteria.....	6-28
6.4.2 Evaluation.....	6-29
Chapter 7 – Alternative Strategies	7-1
7.1 Introduction	7-1
7.2 Statewide Alternative Strategies to Support Emerging Issues.....	7-2
7.2.1 Unmanned Aircraft Systems	7-2
7.2.2 NextGen.....	7-3
7.2.3 Infrastructure Funding Challenges	7-4
7.3 Regional Airport Needs and Alternative Strategies	7-6
7.3.1 Capacity Evaluation	7-6
7.3.2 Activity Evaluation.....	7-13
7.3.3 System Accessibility	7-25
7.4 Airport Alternative Strategies.....	7-41
7.5 Summary.....	7-51
Chapter 8 – Multimodal Planning.....	8-1
8.1 Planning	8-1
8.1.1 Which Transportation Modes Should Cities and Counties Address in Their Plans?.....	8-1
8.1.2 What Are the Benefits of Planning for All Modes?.....	8-1
8.1.3 How Is the Planning for All Modes Integrated?.....	8-1
8.2 Practical Solutions.....	8-4
8.2.1 Moving Toward an Integrated System: Practical Solutions	8-5

8.3	Airport Land-Use Policy Overview.....	8-6
8.3.1	Multimodal Transportation Policy.....	8-6
8.3.2	Economic Policy.....	8-6
8.3.3	Public Health and Safety Policy.....	8-6
8.3.4	Formal Consultation.....	8-7
8.3.5	Requirements	8-7
8.3.6	Recommendations.....	8-7
	Chapter 9 – Policy Recommendations.....	9-1
9.1	Aeronautical and Airport Safety	9-1
9.2	Economic Development and Vitality	9-2
9.3	Education, Outreach, and Community Engagement	9-3
9.4	Infrastructure Improvement, Preservation, and Capacity	9-3
9.5	Aviation Innovation	9-4
9.6	Modal Mobility, Capacity, and Accessibility.....	9-5
9.7	Stewardship	9-6
9.8	Sustainability.....	9-7
9.9	Continuous Planning	9-9
9.9.1	Airport Pavement Management System.....	9-10
9.9.2	Economic Impact Study	9-10
9.9.3	State Aviation System Plan.....	9-10
9.9.4	Statewide Capacity Study	9-11
9.9.5	Best Management Practices.....	9-11
9.9.6	Statewide NextGen Analysis.....	9-11
9.9.7	Land Use Compatibility and Stakeholder Engagement	9-12
9.10	Summary.....	9-12

Tables

Table 2-1. Summary of Goals, Objectives, and System Performance Measures	2-9
Table 3-1. NPIAS Primary Airports	3-6
Table 3-2. General Aviation Reliever Airports.....	3-6
Table 3-3. Runway Types and Surfaces by Classification	3-9
Table 3-4. Average Number of Runways per Airport by Classification.....	10
Table 3-5. Number and Percent of System Runways that are 5,000 feet or Longer	3-10
Table 3-6. Primary Runway Length Averages by WA State Classification.....	3-10
Table 3-7. Percentage of RSA-compliant Runways.....	3-13
Table 3-8. Taxiway Types by Classification.....	3-13
Table 3-9. Taxiway Safety Area Width Compliance by State Classification	3-14
Table 3-10. Pilot and Passenger Terminal Facilities at Washington State Airports	3-17
Table 3-11. Percent of Tie Downs and Hangar Types by Airport Classification.....	3-19
Table 3-12. Baseline 2015 Based Aircraft Data Reported in Survey by State Classification	3-20
Table 3-13. Baseline 2015 Operations and Enplanement Data Reported in Survey by State Classification.....	3-21
Table 3-14. Aircraft Activity Reported by Surveyed Facilities	3-22
Table 3-15. Predominant Zoning by State Classification	3-24
Table 4-1. Forecast Summary.....	4-2
Table 4-2. U.S. Mainline Carriers (2000–2015).....	4-5
Table 4-3. Projection of U.S. Carrier Enplanements (millions)	4-9
Table 4-4. Historical and Projected Active Pilots by Certificate Type	4-14
Table 4-5. Historical and Projected General Aviation Fleet Mix	4-16
Table 4-6. Comparison of Washington State Enplanements to Northwest Mountain Region and U.S.....	4-20
Table 4-7. Washington State Air Carrier and Air Taxi/Commuter Aircraft Operations	4-22
Table 4-8. Washington State Based Aircraft	4-23
Table 4-9. Washington State Noncommercial and General Aviation Aircraft Operations.....	4-25
Table 4-10. Projected Enplanements	4-27
Table 4-11. Projected Air Carrier and Air Taxi/Commuter Aircraft Operations.....	4-30
Table 4-12. Noncommercial Aircraft Operations Projections	4-31
Table 4-13. Based Aircraft Projections.....	4-33
Table 4-14. Forecast Summary.....	4-34
Table 4-15. Top Air Cargo Airlines (2014)	4-39
Table 4-16. Top International Third Party Logistics Service Providers (based on 2012 gross revenues)	4-41
Table 4-17. Select West Coast Historical Air Cargo Activity (metric tons)	4-43
Table 4-18. Washington State Air Cargo Airports (metric tons).....	4-46
Table 4-19. Historical Air Cargo Trends at Seattle/Tacoma International Airport (metric tons)	4-50
Table 4-20. Historical Freighter and Belly Cargo at Seattle/Tacoma International Airport (metric tons)	4-52

Table 4-21. Domestic and International Air Cargo Trends at Seattle/Tacoma International Airport (metric tons)	4-53
Table 4-22. Air Mail Trends at Seattle/Tacoma International Airport (metric tons)	4-54
Table 4-23. Air Cargo Trends at King County International Airport (metric tons).....	4-57
Table 4-24. Air Cargo Trends at Spokane International Airport (metric tons)	4-58
Table 4-25. Summary of Air Cargo Forecast for Washington State (metric tons)	4-62
Table 4-26. Air Cargo Forecast for Seattle-Tacoma International Airport (metric tons)	4-68
Table 4-27. Air Cargo Forecast for King County International Airport (metric tons).....	4-69
Table 4-28. Air Cargo Forecast for Spokane International Airport (metric tons)	4-69
Table 4-29. Air Cargo Forecast for Washington Nonhub Airports (metric tons).....	4-70
Table 4-1. Forecast Summary.....	4-2
Table 4-2. U.S. Mainline Carriers (2000–2015).....	4-5
Table 4-3. Projection of U.S. Carrier Enplanements (millions)	4-9
Table 4-4. Historical and Projected Active Pilots by Certificate Type	4-14
Table 4-5. Historical and Projected General Aviation Fleet Mix	4-16
Table 4-6. Comparison of Washington State Enplanements to Northwest Mountain Region and U.S.	4-20
Table 4-7. Washington State Air Carrier and Air Taxi/Commuter Aircraft Operations	4-22
Table 4-8. Washington State Based Aircraft	4-23
Table 4-9. Washington State Noncommercial and General Aviation Aircraft Operations.....	4-25
Table 4-10. Projected Enplanements	4-27
Table 4-11. Projected Air Carrier and Air Taxi/Commuter Aircraft Operations.....	4-30
Table 4-12. Noncommercial Aircraft Operations Projections	4-31
Table 4-13. Based Aircraft Projections.....	4-33
Table 4-14. Forecast Summary.....	4-34
Table 4-15. Top Air Cargo Airlines (2014)	4-39
Table 4-16. Top International Third Party Logistics Service Providers (based on 2012 gross revenues)	4-41
Table 4-17. Select West Coast Historical Air Cargo Activity (metric tons)	4-43
Table 4-18. Washington State Air Cargo Airports (metric tons).....	4-46
Table 4-19. Historical Air Cargo Trends at Seattle/Tacoma International Airport (metric tons)	4-50
Table 4-20. Historical Freighter and Belly Cargo at Seattle/Tacoma International Airport (metric tons)	4-52
Table 4-21. Domestic and International Air Cargo Trends at Seattle/Tacoma International Airport (metric tons)	4-53
Table 4-22. Air Mail Trends at Seattle/Tacoma International Airport (metric tons)	4-54
Table 4-23. Air Cargo Trends at King County International Airport (metric tons).....	4-57
Table 4-24. Air Cargo Trends at Spokane International Airport (metric tons)	4-58
Table 4-25. Summary of Air Cargo Forecast for Washington State (metric tons)	4-62
Table 4-26. Air Cargo Forecast for Seattle-Tacoma International Airport (metric tons)	4-68
Table 4-27. Air Cargo Forecast for King County International Airport (metric tons).....	4-69
Table 4-28. Air Cargo Forecast for Spokane International Airport (metric tons)	4-69

Table 4-29. Air Cargo Forecast for Washington Nonhub Airports (metric tons).....	4-70
Table 5-1. 2014 Operations as Percent of Current Capacity by Airport Service Classification	5-4
Table 5-2. Washington Airports Over 60 Percent Operations Capacity as of 2014.....	5-4
Table 5-3. Airports with Anticipated Constraints in Aircraft Operational Capacity by 2034	5-6
Table 5-4. 2014 Statewide Aircraft Storage Capacity Shortfall, by number of storage positions	5-9
Table 5-5. 2034 Statewide Aircraft Storage Capacity Shortfall, by number of storage positions	5-12
Table 6-1. FAA NPIAS Airport Classifications	6-2
Table 6-2. FAA GA ASSET Airport Classifications.....	6-2
Table 6-3. 2009 WASP Classifications	6-3
Table 6-4. Airport Reference Code (ARC) Dimensions.....	6-5
Table 6-5. WASP Airport Classifications Summary.....	6-6
Table 6-6. Aeronautical and Airport Safety Metric: Obstructions.....	6-9
Table 6-7. Aeronautical and Airport Safety Metric: Weather Services	6-10
Table 6-8. Aeronautical and Airport Safety Metric: Airfield Geometry Design Standards.....	6-11
Table 6-9. Economic Development and Vitality Metric: Collaboration with Government Agencies on Economic Opportunities	6-12
Table 6-10. Economic Development and Vitality Metric: Partner with Industry to Support Activities	6-12
Table 6-11. Economic Development and Vitality Metric: Cargo Activity Reporting	6-13
Table 6-12. Education, Outreach, and Community Engagement Metric: Aviation Outreach and Engagement	6-14
Table 6-13. Infrastructure Improvement, Preservation, and Capacity Metric: Physical Condition of Infrastructure.....	6-15
Table 6-14. Infrastructure Improvement, Preservation, and Capacity Metric: Airport Capacity	6-17
Table 6-15. Aviation Innovation Metric: Integration of Aviation Innovation.....	6-18
Table 6-16. Modal Mobility, Capacity, and Accessibility Metric: Ground Access	6-19
Table 6-17. Stewardship Metric: Airport Maintenance	6-20
Table 6-18. Stewardship Metric: Planning.....	6-21
Table 6-19. Stewardship Metric: Land Use	6-22
Table 6-20. Stewardship Metric: Emergency Response Plan.....	6-23
Table 6-21. Sustainability Metric: Environmental Sustainability.....	6-24
Table 6-22. Sustainability Metric: Land Use Controls	6-25
Table 6-23. Sustainability Metric: Financial Sustainability.....	6-25
Table 7-1. Airfield Capacity.....	7-7
Table 7-2. 2034 Aircraft Storage Capacity	7-10
Table 7-3. Airports Over 60 Percent Capacity by Region	7-10
Table 7-4. Number of Airports by Region	7-14
Table 7-5. Agricultural Activity by Region.....	7-15
Table 7-6. Pilot Training and Certification Activity by Region.....	7-17
Table 7-7. Business and Corporate Travel Activity by Region.....	7-19
Table 7-8. Air Cargo Activity by Region	7-21
Table 7-9. Aerospace Manufacturing Activity by Region	7-23

Table 7-10. Percent of Statewide Population within a 30-minute Drive Time of System Airports by Classification.....	7-26
Table 9-1. Summary of Policy Recommendations by Goal	9-7

Figures

Figure 1-1. Main Elements of Washington Airport System Plan.....	1-2
Figure 3-1. Distribution of System Airports Amount Classifications	3-3
Figure 3-2. Washington State Public Use Airports	3-4
Figure 3-3. NPIAS Primary and Nonprimary Airports.....	3-5
Figure 3-4. Washington State Airports by FAA ASSET Category	3-7
Figure 3-5. Runway Surfaces for all Runways System-wide	3-11
Figure 3-6. Primary Runway Surface Types	3-11
Figure 3-7. FAR Part 77 Two-Dimensional Graphic of Surfaces	3-15
Figure 3-8. Airports Reporting Clear Part 77 Approaches.....	3-15
Figure 3-9. Airports Reporting Adequate Access Roads	3-16
Figure 3-10. Fuel Types provided by WA State classification	3-17
Figure 3-11. Airport Facilities Reporting Airport Business Park, Landside Real Estate Development, or Revenue from Aircraft Manufacturing Tenants.....	3-18
Figure 3-12. Fixed Wing Aircraft by State Classification	3-20
Figure 3-13. Percentage of Airports with Airport Zoning as Predominant Zoning Class.....	3-23
Figure 4-1. Illustrative Forecast Summary	4-2
Figure 4-2. Historical U.S. Enplanements.....	4-4
Figure 4-3. Monthly Average U.S. Oil and Jet A Prices.....	4-6
Figure 4-4. Historical U.S. Commercial Carrier Capacity and Load Factors.....	4-7
Figure 4-5. Historical and Projected U.S. Enplanements	4-10
Figure 4-6. Projected U.S. Commercial Carrier Capacity and Load Factors	4-11
Figure 4-7. Historical General Aviation Aircraft Shipments and Billings.....	4-12
Figure 4-8. Active Pilots Share by Aircraft Certificate Type (2007–2035)	4-15
Figure 4-9. Projected Growth of Active Pilots (2014–2035)	4-15
Figure 4-10. Projected Growth of General Aviation Aircraft (2014 –2035).....	4-17
Figure 4-11. Aircraft Fleet Mix by Aircraft Type	4-17
Figure 4-12. Historical Enplanements at Washington State Airports	4-20
Figure 4-13. Historical Air Carrier and Air Taxi/Commuter Operations in Washington State.....	4-21
Figure 4-14. Historical Commercial Based Aircraft in Washington State	4-23
Figure 4-15. Historical Noncommercial and General Aviation Aircraft Operations in Washington State	4-24
Figure 4-16. Projected Enplanements by Study Classification.....	4-28
Figure 4-17. Air Carrier and Air Taxi/Commuter Aircraft Operations by Study Classification	4-29
Figure 4-18. Noncommercial Aircraft Operations by Study Classification	4-32
Figure 4-19. Share of Noncommercial Aircraft Operations by Study Classification	4-32

Figure 4-20. Enplanement Projections (in millions)	4-35
Figure 4-21. Air Carrier and Air Taxi/Commuter Aircraft Operations Projections (in thousands).....	4-35
Figure 4-22. Noncommercial Aircraft Operations Projections (in millions)	4-36
Figure 4-23. Based Aircraft Projections (in thousands)	4-36
Figure 4-24. Freighter Aircraft Landed Weight and Cargo Tonnages (2014)	4-44
Figure 4-25. Washington State Air Cargo Trends (2004–2014)	4-45
Figure 4-26. U.S. and Washington State Air Cargo Tonnage Trends	4-45
Figure 4-27. Primary Washington State Air Cargo Markets	4-47
Figure 4-28. Secondary Washington State Air Cargo Markets.....	4-48
Figure 4-29. Historical Air Cargo Trends at Seattle/Tacoma International Airport.....	4-51
Figure 4-30. Historical Belly and Freighter Cargo at Seattle/Tacoma International Airport	4-52
Figure 4-31. Domestic and International Air Cargo Trends at Seattle/Tacoma International Airport	4-53
Figure 4-32. Air Mail Trends at Seattle/Tacoma International Airport	4-55
Figure 4-33. Air Cargo Market Share at King County International Airport for 2014	4-56
Figure 4-34. Air Cargo Trends at King County International Airport (metric tons)	4-57
Figure 4-35. Air Cargo Trends at Spokane International Airport (metric tons)	4-59
Figure 4-36. World GDP Forecast Growth by Region.....	4-63
Figure 4-37. Washington State Air Imports and Exports	4-64
Figure 4-38. Washington State Air Exports and Import Share by Region (based on weight).....	4-65
Figure 5-1. Washington Airports Expected to Approach or Exceed 100-Percent Capacity by 2034	5-2
Figure 5-2. 2014 Statewide Annual Service Volume Capacity by Airport Service Classification	5-3
Figure 5-3. 2014 vs. 2034 Aircraft Operations Demand/Capacity Utilization by Service Classification.....	5-5
Figure 5-4. 2014 Washington State Aircraft Storage Demand vs. Capacity by Service Classification.....	5-7
Figure 5-5. 2014 Washington State Aircraft Storage Demand vs. Capacity	5-8
Figure 5-6. 2034 Washington State Aircraft Storage Demand vs. Capacity by Service Classification.....	5-10
Figure 5-7. 2034 Washington State Aircraft Storage Demand vs. Capacity.....	5-11
Figure 5-8. Integrating the Airport with the Community	5-14
Figure 6-1. Example of Pavement Conditions.....	6-16
Figure 6-2. Summary of Airport Metrics.....	6-26
Figure 7-1. 2034 Airfield Capacity Constraints	7-8
Figure 7-2. 2034 Aircraft Storage Capacity	7-11
Figure 7-3. Agricultural Activity by Region	7-16
Figure 7-4. Pilot Training and Certification Activity by Region.....	7-18
Figure 7-5. Business and Corporate Travel Activity by Region	7-20
Figure 7-6. Air Cargo Activity by Region	7-22
Figure 7-7. Aerospace Manufacturing Activity by Region	7-24
Figure 7-8. 30-Minute Drive Times of Major Airports.....	7-27
Figure 7-9. 30-Minute Drive Times of Major and Regional Airports	7-28

Figure 7-10. 30-Minute Drive Times of Major, Regional, and Community Airports	7-29
Figure 7-11. 30-Minute Drive Times of Major, Regional, Community, and Local Airports	7-30
Figure 7-12. 30-Minute Drive Times of All Airports	7-31
Figure 7-13. 30-Minute Drive Times of All Airports with Protected Areas	7-33
Figure 7-14. 45-Minute Drive Times of All Airports with Protected Areas	7-34
Figure 7-15. Commercial Service Accessibility – SEA and GEG 90-Minute Drive Times	7-36
Figure 7-16. Commercial Service Accessibility – Other Commercial Airports 60-Minute Drive Times.....	7-37
Figure 7-17. Combined Commercial Service Airport Accessibility.....	7-38
Figure 7-18. Airports with Attributes to Meet Average Business User by Region.....	7-40
Figure 7-19. Alternative Strategy Categories.....	7-42
Figure 7-20. Alternative Strategy Focus Areas	7-43
Figure 7-21. Alternative Strategy Objectives/Outcomes	7-44
Figure 7-22. Alternative Strategy Development Process	7-44
Figure 7-23. Alternative Airport Strategies – Examples of Infrastructure Improvements	7-45
Figure 7-24. Alternative Airport Strategies – Examples of Education and Training.....	7-47
Figure 7-25. Alternative Airport Strategies – Examples of Stakeholder Collaboration.....	7-48
Figure 7-26. Alternative Airport Strategies – Examples of Industry/Community Partnerships.....	7-49
Figure 7-27. Alternative Airport Strategies – Examples of Planning.....	7-51

Appendices

Appendix A Glossary of Terms

Appendix B Emerging Issues Papers

 Aerospace Manufacturing

 Aircraft Fuels

 Aircraft Innovation

 ATC Funding Challenges

 Decline in GA

 Infrastructure Funding Challenges

 Next Gen Impacts

 Unmanned Aircraft Systems

Appendix C Airport Classification Lists

 C-1 Organized by Proposed Classification

 C-2 Organized by Associated City